



National Weather Service  
Quad Cities  
**School Guide**



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# ***Introduction***

On April 8, 1999 at 5 p.m. the skies were partly sunny and the temperature was in the 70s in Hamilton, Illinois. Several sporting events were scheduled for that evening in the Hamilton School District, including a baseball game and a track meet. At 6:52 p.m. an F3 tornado struck Hamilton, including the baseball field and track where the events had been planned. No one was hurt. No one was even there. Why? Because a school official was aware that there was a risk of severe weather that day. He called the National Weather Service that afternoon, and based on a real-time assessment of the potential for severe weather, made the tough decision to cancel the events, in spite of the current tranquil conditions. He undoubtedly saved lives.

We are the National Weather Service, Quad Cities Forecast Office, serving eastern Iowa, western Illinois, and northeast Missouri. Our mission is to protect lives and property from the effects of extreme weather, including everything from fog to lightning, tornadoes to blizzards, wind chill to heat waves. We provide information to help officials and local school decision-makers anticipate the effects of all types of weather on staff, students, and activities. We want to help you plan and prepare for the variety of weather conditions that we face here in the Midwest.

This guide is designed to outline for you the support available to all schools by our office. For further information about our office, products, or services, contact Donna Dubberke at (563) 386-3976, ext. 726 or [donna.dubberke@noaa.gov](mailto:donna.dubberke@noaa.gov).

Last Updated October 22, 2010

## ***Background & Mission***

“The National Weather Service provides weather, hydrologic, and climate data, forecasts, and warnings ... for the protection of life and property and the enhancement of the national economy.”

This mission is carried out by a highly trained workforce amidst a network of weather offices located throughout the United States and its territories. Through this network, the National Weather Service provides data to several user communities around the clock. Information is made available to the private sector through such outlets as the NOAA All Hazards Wire Service and the Emergency Managers Weather Information Network to meet specific and unique individual, corporate, and educational needs.

The National Weather Service offers:

- Warnings and Forecasts for Severe Weather
- Warnings and Forecasts for Winter Weather
- Warnings and Forecasts for Non-Precipitation Hazards
- Warnings and Forecasts for the Aviation, Hydrologic, Marine, and Fire Weather Communities
- Digital and Text Forecasts for Various Weather Parameters through 7 Days
- Forecasts for General Weather Trends beyond 7 Days
- Spot Weather Forecasts for Emergency Management and Land Management Agencies in support of HAZMAT and Wild Fire Containment
- High-Quality Data Collection and Distribution to the Private Sector
- Historical Databases of Climate Phenomena
- Preparedness information for all seasons

Within the framework outlined above, our priority for service to the nation is ***protection of life and property, and enhancement of the national economy***. For the National Weather Service in the Quad Cities, this means constantly striving to provide accurate weather and hydrologic services to the best of our ability for the residents in eastern Iowa, northwest Illinois and northeast Missouri.

# ***Hazardous Weather***

It was July 13, 2004 at about 4:30 pm in the afternoon. A tornado packing winds over 200 mph tracked near Roanoke, Illinois, struck Parsons Manufacturing. Cars and semi trucks were tossed. I-beams were twisted. The factory was demolished. There were 140 people in the building at the time. No fatalities. No injuries. Not even a scratch.

What is the secret to this amazing success story? It can be boiled down to Bob Parsons, the owner of the company, and his commitment to protecting his employees from the very real danger of severe weather in the Midwest. Mr. Parsons instituted an extraordinarily effective severe weather strategy that went far beyond putting a plan on paper.

It started with his severe weather plan – including the construction of 3 tornado shelters in the facility. Then they practiced. In fact, they had had a tornado drill at the factory one week before the tornado struck. They monitored the weather using a designated weather watcher – the security staff who monitored their weather radio and the sky. And when the time came to act, it only took 3 minutes to get everyone to safety.

Each piece of the puzzle is critical. If you take any single piece out, you don't have the whole picture; you can't expect the same outcome.



## ***Plan:***

### **An Effective Hazardous Weather Plan**

- Plan**
- Know the threats
  - Address each threat as it applies to your faculty, staff, and students (Flash Flood, Hail, Blizzard, Extreme Heat/Cold, Tornado, Extreme wind, Lightning)
  - Consider time of day
    - peak tornado occurrence is 4-7 pm
    - peak high wind occurrence is 6-9 pm

- Practice**
- Training meetings: Make sure everyone knows the plan
  - Drills: Practice the plan
    - Evaluate time needed
    - Evaluate suitability of shelters
  - Severe Weather Awareness Week – tornado drill day for each state

- Monitor**
- Designated Weather Watcher
  - Available information: before, during, after
    - Outlook: what to expect that day
    - Watch: within a few hours
    - Warning: severe thunderstorm, tornado
  - Your eyes: the spotter network

- Act**
- Be proactive
  - Establish criteria
    - Based on watches, warnings, reports, other?
    - Consider how much time you need for people to reach shelter
  - How will action be initiated?
    - Means of communication
    - Backup plan
  - Where will people go?
    - Recommended saferooms
    - Lowest Floor
    - Interior of Building
    - Small roof spans
    - Without windows
    - Enough space
    - Enough time to get there
  - How will you communicate an “all-clear”?

## ***Plan:***

### **Identifying Safe Areas in Your Facility**

The greatest dangers from tornados and high wind are roof failure, breaking glass, and flying debris. **The most dangerous locations in schools are generally large rooms with big expansive roofs such as cafeterias, gyms, and auditoriums.** In these cases, loss of a load-bearing wall may lead to failure of the entire roof. Rooms with large windows that may shatter when struck by airborne missiles or pressure stresses are also extremely dangerous. Once strong wind enters a building, a domino effect of damage can occur. Closure of internal fire doors may be a method to limit this problem. Do not open windows. This may actually result in greater damage and wastes valuable time that should be used moving to a safe location.

The best protection is offered by small interior rooms, bathrooms, and windowless, interior hallways that are away from exterior doors. Interior load-bearing walls with short roof spans provide better protection than temporary or non-load bearing walls or structures. In multi-level schools, always evacuate the upper level and move to the lowest available levels (including basement, if possible). When time permits, evacuate temporary buildings.

Some schools designed in the open-classroom concept may have a less than desirable amount of safe space due to a lack of interior load-bearing walls, large spanning roofs, and large windows. You may not be able to find enough "ideal" space for all students. In this case, you will need to prioritize the space available. Start with (1) interior, lower level non-load bearing walls; then (2) interior walls of upper levels, exterior walls of lower levels, and interior glass; (3) exterior walls of upper levels; (4) rooms with large roof spans, mobile, or temporary classrooms; and (5) windows in exterior walls.

Fortunately, the majority of tornadoes and downbursts will not destroy well constructed buildings, and damage in about 70% of cases would be confined to rooms with large roof spans. You may wish to use the ranking above and prioritize your safe areas, filling students in those locations first. When developing your local plan, it is best to have an engineer advise your school on the safest areas since they understand the design of your particular facility. The list above is based on broad generalities.

For details on engineered tornado shelters, visit FEMA's web site at [www.fema.gov/mit/saferoom](http://www.fema.gov/mit/saferoom)

### **Special Considerations**

One complication to activating a full "Call to Action" plan is if it occurs during class changes when the halls are crowded and students may not know where to go. It may be best to hold classes beyond regular dismissal time until the severe weather threat has passed. Likewise, at the end of the school day, students may need to be held from boarding busses until the danger has passed.

#### **Special Considerations for Winter Weather**

Teachers and bus drivers should be taught to recognize symptoms of frost bite and hypothermia. Delaying school hours may or may not solve the problem of students standing at bus stops in the cold. Bus stop shelters would help protect the students from the exposure to wind.

#### **Special Considerations for Heat**

Humidity adds to the effects of heat. In any kind of hot weather, heat disorders such as cramps, heat exhaustion, and heatstroke are possible. Students should be kept out of the sun and strenuous activities should be eliminated. Encourage students to drink lots of water and wear light-colored, light-weight clothing. Teachers, coaches, and bus drivers should know the symptoms of heat disorders.

## ***Practice:***

### **Severe Weather Awareness Week**

Practice makes perfect. Practicing your severe weather emergency plan through periodic severe weather drills and severe weather safety training is critical to success. Drills not only teach students and instructors the actions they need to take, but will allow you to evaluate your plan's effectiveness.

Two drills per year are recommended: one in the fall as an introduction for new students and teachers, and the second in the early spring. You may wish to conduct the spring drill in conjunction with Severe Weather Awareness Week. Each state designates a week each year as Severe Weather Awareness week. Within that week, a date and time is set for a tornado drill. At that time, a test tornado warning will be issued and disseminated. This allows you the opportunity to test your communications and strategy, beginning to end.

Illinois usually designates the first week of March as Severe Weather Awareness Week. Iowa typically designates the last week of March, and Missouri designates a week in the middle of March.

Tornado drill dates and times can be found at:

Nationwide:

<http://weather.gov/om/severeweather/severewxcal.shtml>

Iowa:

[www.iowahomelandsecurity.org](http://www.iowahomelandsecurity.org)

Illinois:

[www.state.il.us/iema](http://www.state.il.us/iema)

Missouri:

<http://sema.dps.mo.gov>



## **Monitor:**

### **Designated Weather Watcher**

The designated weather watcher is key to the success of any severe weather plan. ***The designated weather watcher monitors weather information, allowing everyone else to focus on the activities at hand.*** During school functions such as sporting events, graduations, etc, it is especially important to designate a weather watcher to keep tabs on changing conditions and alert the decision makers to any impending hazard.

- **Know what is expected:** Typically someone would start the day by reviewing the Hazardous Weather Outlook for an overview of any anticipated hazards that day. The HWO is available on the web site and on NOAA All Hazards Radio. For more about the Outlook, see the descriptions of our products on pages 10 and 11 of this guide.
- **Hazardous weather monitoring:** All advisories, watches, and warnings are available both on our homepage and NOAA All Hazards Radio. Also available is the Short Term Forecast. The Short Term Forecast can be particularly helpful in monitoring non-severe weather, including thunderstorms and lightning.

The fastest, most accurate and reliable means of receiving critical weather information at your school is through a NOAA All Hazards Radio with a "tone alert" feature. Warnings are broadcast within seconds of being issued by the National Weather Service.

Consider a handheld NOAA Radio for outdoor activities.

Your radio or television should be located in the main office or near the person(s) responsible for enacting the plan. Main offices are good because generally there is always a number of people around who could hear the alert, and in a quick emergency, it is close to the public address (PA) system. NOAA Radios should be set at all times in "Alert" mode.

It is also handy to keep a detailed map nearby for quick reference to locate storms and their movement in relation to your school. When a warning is issued for a nearby area, you may or may not need to take action, depending on the storm's path and speed of movement. When a warning is issued that includes your community, quick action may be needed.

If your school is not in a reliable NOAA Radio listening area, try attaching your radio to an exterior antenna. If that does not help, here are a few alternatives -

- If you have cable television access, The Weather Channel uses NWS products and broadcasts warnings immediately upon receipt from NWS via a satellite link. Warnings are continuously scrolled across the bottom of the screen.
- Some cable companies include a channel with a local NWS radar display and use NOAA All Hazards Radio as a voice-over.
- Monitor your local news radio station for emergency messages and special statements from the National Weather Service. Through a cooperative agreement between broadcasters and federal, state, and local government agencies (known as the Emergency Alert System or EAS), emergency messages are broadcast over commercial and public radio and television stations. Typically tornado warnings and flash flood warnings are automatically broadcast, although the messages that are broadcast vary from station to station.

Phone "call-down" systems are not advised for receipt of warning information due to time elapsed in relaying information, chance of incorrect or incomplete information being passed, lack of reliability of phone systems during storms, and the NWS advises people not to use telephones during an electrical storm.

# **Monitor**

## **Text Services from the NWS**

The National Weather Service provides a number of text services which can assist you in decision-making for weather-sensitive activities. All of these products are available 24-7 on our web page and via NOAA All Hazards Radio. A list and brief description of the most common products follows.

**Hazardous Weather Outlook** - A narrative outlook which discusses the potential for significant weather primarily during the next twenty-four hours. The timing, location, amount and duration of snow, blowing snow, ice, rain, wind, severe weather, flooding/flash flooding, extreme heat/humidity, and freezes/frosts are discussed. This product is designed for decision makers such as emergency managers, police/fire departments, school districts, transportation departments, severe weather spotters, etc.

The Hazardous Weather Outlook is issued each morning by 5 am, and updated at other times as needed. It is broadcast on NOAA All Hazards Radio and is available on our webpage.

**Watches (both Winter and Summer)** - Watches are issued to indicate that hazardous weather is possible in the next few hours.

- Severe Thunderstorm Watch - indicates severe weather (large hail  $\frac{3}{4}$  inch and/or damaging straight-line winds  $\geq 58$  mph) is possible in and close to the Watch area. These Watches are generally issued for areas the size of a state or parts of a few states, and are valid for a four- to six-hour period.
- Tornado Watch - indicates tornadoes are possible in and close to the Watch area. These Watches are generally issued for areas and durations similar to severe thunderstorm watches.
- Flash Flood Watch - indicates flash flooding is possible in and close to the Watch area. Watches are generally issued for areas less than the size of a state and can be valid for up to about 12 hours.
- Winter Storm Watch - issued 18 to 36 hours in advance of winter weather conditions (blizzards, snow, blowing snow, ice, wind chills, or combinations thereof) that may become hazardous or life threatening.

**Warnings** - Issued when life-threatening conditions exist or are imminent.

- Severe Thunderstorm Warning - A severe thunderstorm (hail 1 inch diameter and/or straight-line wind  $>58$  mph) is indicated by radar or has been reported by a reliable source. Usually issued for parts of a few counties up to one hour in duration.
- Tornado Warning - A tornado is indicated by radar or a reliable source. Usually issued for parts of a few counties up to one hour in duration.
- Flash Flood Warning - Heavy rains are or will shortly result in life-threatening circumstances due to overflowing streams or creeks, mud slides, dam breaks, water over roadways, etc. Usually issued for portions of a few counties for up to six-hour duration.
- Extreme Heat Warning - Heat Index (HI)  $105^{\circ}\text{F}$  and a minimum overnight HI of  $75^{\circ}\text{F}$ .
- High Wind Warning - Sustained winds 40 mph for 1 hour or more or gusts 58 mph.
- Blizzard Warning - Sustained wind or frequent gusts  $\geq 35$  mph, considerable blowing and drifting of snow, and a visibility of  $\frac{1}{4}$  mile or less.
- Ice Storm Warning - Ice accumulations  $> \frac{1}{4}$  inch.
- Winter Storm Warning - 6 inches of new snow in 12 hours or 8 inches in 24 hours when wind will cause blowing and drifting problems, or for sleet accumulations  $> \frac{1}{2}$ , or a combination.
- Wind Chill Warning - Wind chill values  $-30^{\circ}\text{F}$  or colder

**Advisories** - Issued when conditions are hazardous but not life threatening if reasonable caution is used.

- Air Quality Advisory – During periods of poor air quality as determined by the DNR.
- Dense Fog Advisory – Widespread visibility  $\frac{1}{4}$  mile or less, creating a significant hazard
- Heat Advisory - Heat Index exceeding 100F and/or temperature exceeding 95F.
- Wind Advisory - Sustained winds 30 mph for 1 hour or more or gusts 45 mph.
- Freezing Rain Advisory – Freezing rain or drizzle with minor ice accumulations.
- Wind Chill Advisory - Wind chill values -20 to -29 F.
- Winter Weather Advisory - Hazardous (but not generally life-threatening) conditions of
  - snow - generally 3-5 inches
  - blowing snow - visibility  $\frac{1}{4}$  mile due to blowing
  - sleet – less than  $\frac{1}{2}$  inch accumulation
  - combination of winter precipitation

**Forecasts and Observations –**

- Special Weather Statement - our primary method for communicating forecasts of short-term (one to six hours in advance) weather and hydrologic conditions. Usually issued for non-severe weather.
- Zone Forecast - routine forecasts issued for each county twice daily and updated as required which contain the basic forecast elements (maximum and minimum temperatures, precipitation type and probability, wind, clouds, etc.) For the next 1 to 7 days.
- Hourly Observations - a collection of weather observations made shortly after the top of the hour which contain temperature, current weather, wind, dew point, air pressure and seasonally, the wind chill or heat index.

# ***Monitor***

## **NOAA Weather Radio All Hazards**

NOAA All Hazards Radio provides a continuous broadcast of weather information direct from the local NWS office. Special radios needed to receive the broadcast are available at many stores that sell electronics. All schools received these radios through a Homeland Security grant in 2006-2007. If you do not already have a Weather Radio at your school, please contact your county Emergency Management Agency to find out how to acquire one.

### **About the Broadcast**

Recorded weather messages are repeated every three to five minutes. Routine programming includes current conditions, the 7-day forecast, and recent river stages. During severe weather, the National Weather Service preempts the routine weather broadcast and substitutes the warning messages.

### **All-Hazards**

NOAA All Hazards Radio broadcasts alerts for all types of hazards - not just weather! As conditions warrant, the broadcast includes emergencies such as earthquakes, chemical releases, oil spills, nuclear emergencies, AMBER alerts, and national emergencies. Working with State and Federal agencies, NOAA All Hazards Radio truly is an all-hazards radio network, making it the single source for the most comprehensive weather and emergency information available to the public.

### **Local Coverage**

17 NOAA All Hazards Radio transmitters serve the area covered by WFO Quad Cities. (See Appendix C for a complete listing.) Each station covers an area approximately 40 miles from the antenna site. The effective range depends on many factors, particularly the transmitter height, terrain, receiver quality, and present weather. An outside antenna can significantly improve reception.

### **For schools, we recommend:**

- A radio with the tone alert feature and SAME capability. This type of radio will sound an alarm when a warning is issued for your specific county. (You control the programming of this radio.)
- A battery backup in case of a power failure.
- Some more expensive NWR models can be tied into your PA system, can set off a pager or telephone someone, or have flashing lights.
- Consider a portable radio for your security, principle, coaches, or athletic director.

Remember to:

1. Replace the back-up battery yearly to make sure it will work in the case of a power failure.
2. Place the radio in a central location where the alarm can be heard by the decision makers.
3. Make sure the radio is in stand-by mode, ready to alarm when a warning is issued.
4. Monitor the weekly tone-alert test to make sure your radio is working properly and receiving the tone alert signal. (Tests are conducted every Wednesday around 11 am.)

NOAA All Hazards Radio is the ***smoke detector of severe weather***. Our warnings delivered directly to you immediately when they are issued, so you can take the actions you deem necessary.

### **References:**

Appendix C: Coverage Map and local station listing

Appendix D: FIPS codes for programming radios

National NOAA Weather Radio Page: [www.weather.gov/nwr](http://www.weather.gov/nwr)

Local NOAA Weather Radio Page: [www.weather.gov/quadcities/wxradio](http://www.weather.gov/quadcities/wxradio)

## Monitor:

## Information Superhighway - [www.weather.gov/quadcities](http://www.weather.gov/quadcities)

Whether you need tomorrow's forecast or last month's climate data, WFO Quad Cities Internet page features a wealth of information that is sure to fulfill many of your weather-related needs. To provide a quick assessment of current weather at a glance, links to local forecast and hazardous weather information, radar images, and weather headlines are front-and-center. Also accessible are details on NOAA All Hazards Radio, information and photographs from historic weather events, our online newsletter, and links to a variety of computer model weather data. To support your preparedness and safety needs, a plethora of downloads are also available on our website. Downloads include: brochures, reference materials, weather presentations, and other weather support resources.

NOAA's National Weather Service Weather Forecast Office  
**Quad Cities, IA/IL**

Home Site Map News Organization

Local forecast by "City, St" or Zip Code  
City, St  Go

Current Hazards  
Watches / Warnings  
Outlooks  
U.S. Hazards  
Hurricane Info  
eSpotter

Current Conditions  
Observations  
Satellite Images  
Rivers & Lakes AHPS  
Precip Estimate  
Snow Cover  
Road Conditions  
Drought Status

Radar Imagery  
Local Radar  
Nationwide  
Regional  
Local Radar(Faster)

Forecasts  
Activity Planner  
Local Area  
Aviation  
Fire Weather  
Graphical  
Interactive  
Air Quality  
Space Weather

Rivers / Hydrology  
AHPS / River Info  
Outlook  
Flood Safety

Climate  
Local  
National  
More...

Weather Safety  
StormReady  
Preparedness  
Weather Radio  
EMWIN

Local Information  
Our Office  
Coop Observer  
Science & Education  
Downloads  
Past Events

Top News of the Day  
2009 Spotter Training Schedule

Watches & Warnings Observations Forecast Graphics Rivers & Lakes Climate Winter Weather

Click on the map below for the latest forecast.

Read watches, warnings & advisories

Severe Thunderstorm Warning  
Flood Warning  
Severe Weather Statement  
Winter Weather Advisory  
Dense Fog Advisory  
Flood Watch  
Special Weather Statement  
Hazardous Weather Outlook  
Short Term Forecast

Last map update: Thu, Feb. 26, 2009 at 1:00:26 pm CST

Latest Conditions in Moline, IL Choose Your Front Page City

Feb 26 12:52 pm 44°F (7°C) Fog/Mist Select A City:

Weather Story Radar Satellite Weather Map

...Local Storm Report (LSR) has recently been issued...

Daily Climate Maps Climate Graphs Climate Outlooks

Temp/Precip/Snowfall Records/Normals/Obs Week 2 Through 1 Year

Of particular interest is the array of current weather information-right at your fingertips! This includes:

- **Hazardous weather and hydrologic information** (outlooks, warnings, storm reports)
- **Radar and satellite images**
- **Forecast Information** (public, hydrologic, aviation, and fire weather)
- **Current Conditions** (both general weather and hydrologic)
- **Climate data** (daily, monthly, and record information)

# Act:

## School Severe Weather Safety

**Reminder:** Always take into account the time it will take to move people to the safest places.

### **Alerting Staff, Teachers, and Students to a Weather Emergency**

Most schools utilize a public address (PA) system to talk directly to students and teachers. In some cases, electricity may be lost during a storm before you have activated your plan. Therefore, it is critical to have a back-up alerting device such as a compressed air horn or megaphone. You may need to make special arrangements for

- Outdoor activities
- Mobile classrooms or detached gymnasiums that are not part of a PA or intercom system (Sending "runners" to mobile classrooms is not advised due to the danger posed by lightning and the approaching storm.) Wireless communication devices are an effective means for such communication, such as "Family Radios".
- Handicapped or learning-disabled students, who may require assistance in taking action.

**Outdoors:** Outdoor activities will be the most susceptible to weather hazards with lightning being the greatest threat. Officials involved in all outdoor activities, such as sporting practices and events should be aware of the risks of lightning and severe weather. If thunder is heard or lightning is seen, outdoor activities should be delayed with students and spectators moved to safety immediately. Do not wait for the rain. The delay in activities should last until thunder has not been heard and lightning not seen for 30 minutes.

**Indoors:** Use as much information as possible about the type of storms, expected impact and time of impact on your school district to assess the risk. A plan may work best with phases of activation. For instance, outdoor activities are usually the most susceptible to weather hazards and may be delayed or cancelled first. As the storms approach, you may want to move students from the most susceptible areas of your school, such as mobile classrooms and gymnasiums, to safer areas as a precaution, even though a warning has yet to be issued. (You might also do this for "High Wind Warnings"). For potentially severe thunderstorms, you may want to post teachers or school personnel trained in spotting severe weather in key positions to watch the storms as they approach. When large hail is the main threat, move students out of rooms with skylights.



**The Tornado Safety Position:** For extremely high winds or tornados, assume the tornado safety position. Sit, facing an interior wall. Bend over and cover your head and neck with your hands.

### **Determining When to Hold Departure of School Buses**

Buses provide no protection from severe storms. You will want to consider holding the departure of students to buses whenever watches or warnings are in effect, taking into account (1) the time it will take before all students reach their homes (including time for the students to walk from their bus stop to their home) and (2) when the storms are expected to impact your district. You might also consider if a large number of your children live in mobile homes. The school would provide a far safer environment.

### **After the Event**

Once the storm has past, stay alert for the possibility of additional storms. If your school sustains damage, shut off the gas and electricity for safety purposes. Do not attempt to evacuate students through damaged areas, as downed power lines and debris pose a grave danger.

# **Act:**

## **School Bus Weather Safety**

All school bus drivers should be trained to handle severe weather situations. The primary concerns are flooding and tornadoes, but high wind, heavy snow or ice, extreme heat or cold, and wind chill also pose a threat.

### **Tornadoes:**

- Bus dispatcher should have a NOAA All Hazards Radio with tone alert.
- Don't drive during a "Tornado Warning".
- We recommend that all bus drivers attend Skywarn Spotter training if possible.
- If time permits, drive at a right angle to the funnel path. **You cannot outrun a tornado.**
- Get to a well-constructed building whenever possible.
- If shelter is not available, evacuate students through both exits at the nearest ditch or depression on the downwind side of the road.
- Students should lie flat in a low place facing the funnel cloud and covering their heads.
- Move the bus away from the students, radio the base station, and remove the first aid kit.

### **Flooding:**

**NEVER ATTEMPT TO DRIVE THROUGH FLOOD WATERS!** If your bus route takes you across small streams and creeks or along a river, you should determine an alternate route to travel or have a contingency plan to return to the school once flood waters are encountered. Major river flooding generally is well forecast with warnings issued early enough that schools and drivers can plan their strategy before placing the students on the bus. In general, shallow ponding of water on the roadway is usually not a problem. Sudden (flash) flooding poses the greatest threat.

- If the water is too deep to see the road, **DO NOT CROSS**. The road may have been undermined or the water may be deep enough to stall the bus and place all of its occupants in danger.
- Do not enter underpasses that are filling with water.
- If the water appears to be flowing, do not enter. The bus will act as a barrier and the water will attempt to lift and move the bus.
- If water is flooding over or around a bridge, do not cross it, it might collapse from the weight of the bus. The foundation of the bridge may have been compromised.
- If caught in flood waters, abandon the bus and seek higher ground immediately.

### **Exposure to Heat and Cold:**

Children awaiting the school bus in the morning, standing exposed to a cold wind without proper clothing for protection, may develop hypothermia. School bus drivers and teachers should be taught to recognize symptoms of hypothermia, frost bite, and exhaustion, and heat stress.



## Education Related Services

### Local Continuing Education Opportunities

Through the NWS office in the Quad Cities, we offer one of the following courses each semester.

**DataStreme Atmosphere** (A study of weather and the environment)

[www.ametsoc.org/amsedu/DataStremeFrames.html](http://www.ametsoc.org/amsedu/DataStremeFrames.html)

Or

**Water in the Earth System** (An investigation of the global water cycle and with related issues including weather, water, climate, and the interactions between them)

[www.ametsoc.org/amsedu/WES/home.html](http://www.ametsoc.org/amsedu/WES/home.html)

A few facts about these courses:

- **Free!**
- 3 graduate credits through SUNY Brockport
- Primarily taught online
- Approx. 4 local meetings
- 12 weeks
- Fall or Spring session

To register, contact:

Hector Ibarra  
1940 Rohret Ct SW  
Iowa City, IA 52240  
(319) 337-3590  
[hibarraia@gmail.com](mailto:hibarraia@gmail.com)

### On the Web

NWS Quad Cities Science and Education..... [www.weather.gov/quadcities/?n=scienceandeducation](http://www.weather.gov/quadcities/?n=scienceandeducation)  
Digital Library for Earth System Education (*Resources screened by the NSF*) ..... [www.dlese.org](http://www.dlese.org)  
JetStream (*NWS weather education*)..... [www.srh.weather.gov/jetstream](http://www.srh.weather.gov/jetstream)  
NOAA Education Resources (*comprehensive list of weather resources*) ..... [www.education.noaa.gov](http://www.education.noaa.gov)  
Masters of Disaster ..... [www.redcross.org/disaster/masters](http://www.redcross.org/disaster/masters)  
NWS Teacher Resources ..... [www.nws.noaa.gov/om/edures.shtml](http://www.nws.noaa.gov/om/edures.shtml)  
NWS Weather Education and Outreach Links ..... [www.weather.gov/education.php](http://www.weather.gov/education.php)  
NOAA Teacher at Sea Program..... [teacheratsea.noaa.gov](http://teacheratsea.noaa.gov)  
American Meteorological Society Education Programs ..... [www.ametsoc.org/amsedu](http://www.ametsoc.org/amsedu)  
University Corporation for Atmospheric Research..... [www.ucar.edu/ucar/edout.html](http://www.ucar.edu/ucar/edout.html)

### Classroom Resources

*These or similar materials may be borrowed from local National Weather Service offices for use in the classroom. Contact your local office to discover the specific resources available to you.*

- Safety Videos
- Masters of Disaster classroom kits
- Sunwise toolkit
- "Weather in a Box" instrument kit
- Weathercyclor teaching unit

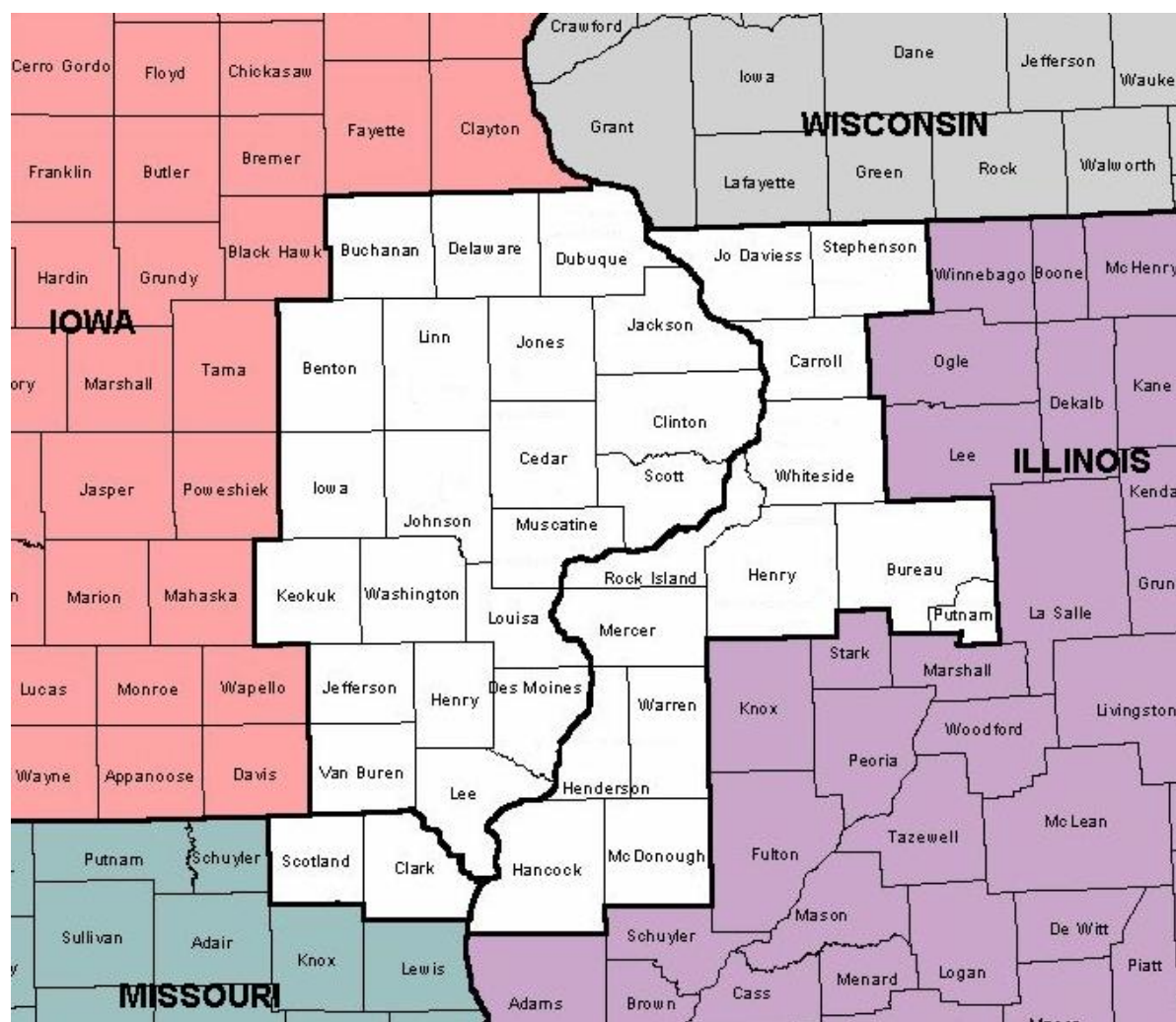


## Appendix A: Service Area Configuration

There are numerous National Weather Service Weather Forecast Offices (WFO) located throughout the United States. Each WFO is responsible for maintaining a database of digital forecast grids within its forecast area for a running 7-day period. The always-current forecast grids become a part of the larger National Digital Forecast Database, which is accessible to everyone. Each office also issues public, aviation, hydrologic, and short-term forecasts. Finally, the WFO disseminates a variety of hazardous weather warnings and statements for all counties within its warning area.

WFO Quad Cities' area of responsibility encompasses 36 counties, comprised of 21 in Iowa, 13 in Illinois, and 2 in Missouri. Immediately surrounding WFO Quad Cities are other offices located in: La Crosse and Madison, Wisconsin; Chicago and Lincoln, Illinois; St. Louis and Kansas City in Missouri; and Des Moines, Iowa.

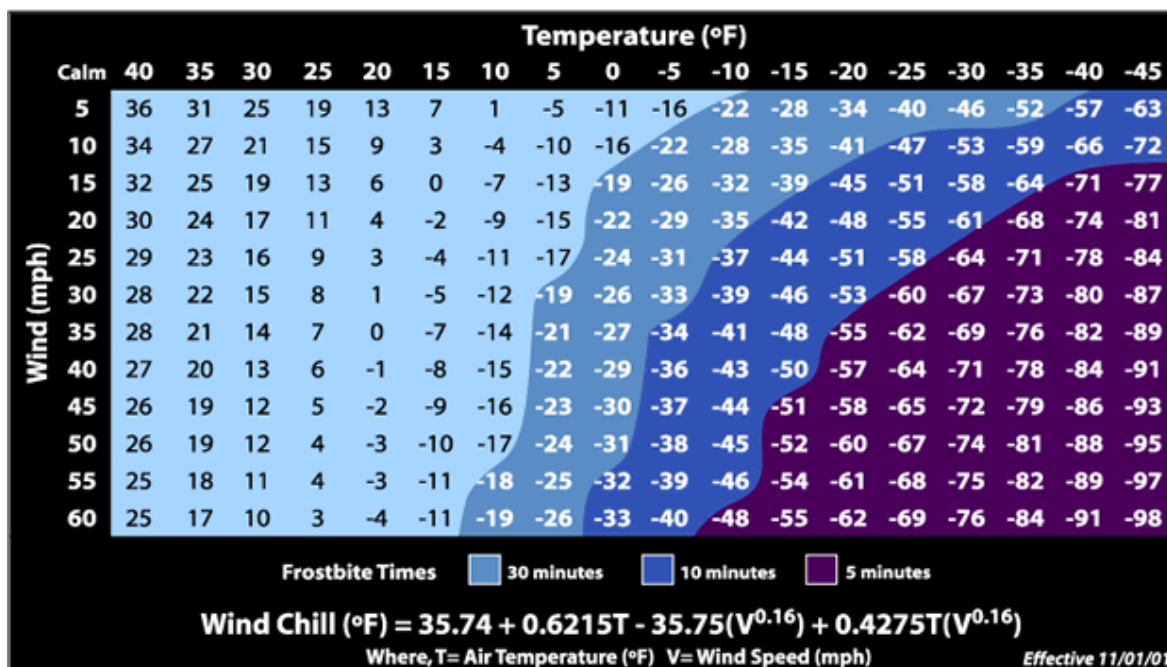
The following map details the county configuration for the Quad Cities Service Area. WFO Quad Cities' area of responsibility encompasses the counties in white:



## Appendix B: Wind Chill and Heat Index Charts



### Wind Chill Chart



### Heat Index (Apparent Temperature) Chart

The **Heat Index (HI)** is the temperature the body feels when heat and humidity are combined. NOTE: This chart is based upon shady, light wind conditions. Exposure to direct sunlight can increase the HI by up to 15°F

#### Heat Index

80 to 89° - Caution

90 to 104° - Extreme Caution

105 to 129° - Danger

130° or higher - Extreme Danger

#### General Effect of Heat Index on People in Higher Risk Groups

Fatigue possible with prolonged exposure and/or physical activity.

Sunstroke, heat cramps and heat exhaustion possible with prolonged exposure and/or physical activity.

Sunstroke, heat cramps or heat exhaustion likely, and heatstroke possible with prolonged exposure and/or physical activity.

Heatstroke/Sunstroke highly likely with prolonged exposure.

#### Relative Humidity (in percent)

		0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
Air Temp (in F)	120	107	111	116	123	130	139	148														
	115	103	107	111	115	120	127	135	143	151												
	110	99	102	105	108	112	117	123	130	137	143	150										
	105	95	97	100	102	105	109	113	118	123	129	135	142	149								
	100	91	93	95	97	99	101	104	107	110	115	120	126	132	138	144						
	95	87	88	90	91	93	94	96	98	101	104	107	110	114	119	124	130	136				
	90	83	84	85	86	87	88	90	91	93	95	96	98	100	102	106	109	113	117	122		
	85	78	79	80	81	82	83	84	85	86	87	88	89	90	91	93	95	97	99	102	105	108
	80	73	74	75	76	77	77	78	79	79	80	81	81	82	83	85	86	86	87	88	89	91

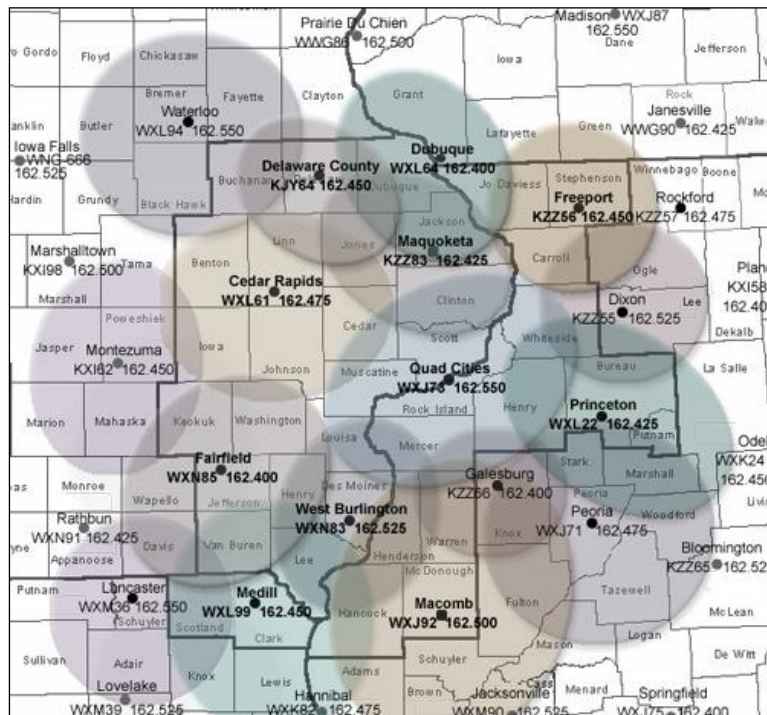
# Appendix C: Local NOAA All Hazards Radio Coverage

NOAA Weather Radio stations operate on one of 7 frequencies:

1. 162.400 MHz
2. 162.425 MHz
3. 162.450 MHz
4. 162.475 MHz
5. 162.500 MHz
6. 162.525 MHz
7. 162.550 MHz

See below for local area stations and exact county coverage. See next page for local FIPS codes.

Visit [www.weather.gov](http://www.weather.gov) for more information.



**Cedar Rapids - WXL61 162.475**  
IA: Benton, Cedar, Delaware, Iowa, Johnson, Jones, Keokuk, Linn, Tama, Washington.

**Delaware County - KJY64 162.450**  
IA: Buchanan, Clayton, Delaware, Dubuque, Fayette, Jones, Linn.

**Dixon - KZZ56 162.525**  
IL: Carroll, Lee, Ogle, Whiteside.

**Dubuque - WXL64 162.400**  
IA: Clayton, Delaware, Dubuque, Jackson, Jones. IL: Carroll, Jo Daviess. WI: Grant, Lafayette.

**Fairfield - WXL85 162.400**  
IA: Davis, Henry, Jefferson, Keokuk, Lee, Van Buren, Wapello, Washington.

**Freeport - KZZ56 162.450**  
IL: Carroll, Jo Daviess, Ogle, Stephenson, Winnebago. WI: Green, Lafayette.

**Galesburg - KZZ66 162.400**  
IL: Henry, Knox, Mercer, Warren.

**Lancaster - WXM36 162.550**  
IA: Davis, Appanoose. MO: Adair, Knox, Putnam, Schuyler, Scotland, Sullivan.

**Macomb - WXJ92 162.500**  
IL: Adams, Brown, Cass, Fulton, Hancock, Henderson, Knox, Mason, McDonough, Schuyler, Warren.

**Maquoketa - KZZ83 162.425**  
IA: Jackson, Dubuque, Jones, Clinton, Cedar, Delaware. IL: Carroll, Jo Daviess.

**Medill - WXL99 162.450**  
MO: Clark, Knox, Lewis, Scotland. IA: Lee, Van Buren. IL: Adams, Hancock.

**Montezuma - KXI62 162.450**  
IA: Iowa, Jasper, Keokuk, Mahaska, Marion, Poweshiek, Tama.

**Peoria - WXJ71 162.475**  
IL: Fulton, Knox, Marshall, Mason, Peoria, Putnam, Stark, Tazewell, Woodford.

**Princeton - WXL22 162.425**  
IL: Bureau, Henry, LaSalle, Lee, Marshall, Putnam, Stark, Whiteside.

**Quad Cities - WXJ73 162.550**  
IA: Clinton, Cedar, Louisa, Muscatine, Scott. IL: Henry, Mercer, Rock Island, Whiteside.

**Waterloo - WXL94 162.550**  
IA: Black Hawk, Bremer, Buchanan, Butler, Chickasaw, Fayette, Floyd, Grundy.

**W Burlington - WXN83 162.525**  
IA: Des Moines, Henry, Lee, Louisa. IL: Hancock, Henderson, Mercer, Warren.

## Appendix D: Area County FIPS Codes

The codes for your local area of concern, called FIPS numbers, should be programmed into a receiver according to the instructions accompanying the radio. While each situation is unique, it is usually a good idea to include warnings for an adjacent county especially when located near a county border.

### A Caution about Programming Your Radio

Remember that your radio will only alert you for counties *within the station's listening area that you are tuned to*, so check the coverage of the local station before you program your radio. If you take your radio on the road with you and frequently travel between two different transmitters, you can usually program multiple counties. For example, say you live in Vinton (Benton County) and work in Waterloo. You could program both Black Hawk and Benton Counties into your radio. Then when you are at home in Vinton, you will only get the Benton County warnings from the Cedar Rapids transmitter, and when you are at work in Waterloo, you would only get the Black Hawk County warnings from the Waterloo transmitter (provided you are on the right frequency). Most SAME radios also have a way to revert to receiving all warnings within the listening area. This is handy when you take your radio on vacation.

**FIPS Codes for the Quad Cities Region**

ILLINOIS	IOWA	IOWA (cont.)
Adams 017001	Benton 019011	Scott 019163
Boone 017007	Black Hawk 019013	Tama 019171
Brown 017009	Bremer 019017	Van Buren 019177
Bureau 017011	Buchanan 019019	Wapello 019179
Carroll 017015	Butler 019023	Washington
Cass 017017	Cedar 019031	019183
Dekalb 017037	Chickasaw 019037	
Fulton 017057	Clayton 019043	
Hancock 017067	Clinton 019045	
Henderson 017071	Davis 019051	
Henry 017073	Delaware 019055	<b>MISSOURI</b>
Jo Daviess 017085	Des Moines 019057	
Knox 017095	Dubuque 019061	Adair 029001
LaSalle 017099	Fayette 019065	Clark 029045
Lee 017103	Floyd 019067	Knox 029103
McDonough 017109	Grundy 019075	Lewis 029111
Marshall 017123	Henry 019087	Putnam 029171
Mason 017125	Iowa 019095	Schuyler 029197
Mercer 017131	Jackson 019097	Scotland 029199
Ogle 017141	Jefferson 019101	
Peoria 017143	Johnson 019103	
Putnam 017155	Jones 019105	<b>WISCONSIN</b>
Rock Island 017161	Keokuk 019107	
Schuyler 017169	Lee 019111	Grant 055043
Stark 017175	Linn 019113	Green 055045
Stephenson 017177	Louisa 019115	Lafayette 055065
Warren 017187	Muscatine 019139	Rock 055105
Whiteside 017195	Poweshiek 019157	
Winnebago 017201		

For FIPS codes for other areas, visit [www.nws.noaa.gov/nwr](http://www.nws.noaa.gov/nwr) or call 1-888-NWR-SAME.

## ***Appendix E: School Weather Preparedness Checklist***

1. Location of NOAA All Hazards Radio or other warning source:

\_\_\_\_\_

2. Person(s) responsible for and method of notifying:

Teachers/student body: \_\_\_\_\_

Temporary buildings: \_\_\_\_\_

Special needs students: \_\_\_\_\_

3. PA system backup:

\_\_\_\_\_

4. High Wind/Tornado Safe-zones (in order of preference):

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

5. People responsible for main electricity shut off: \_\_\_\_\_

6. People responsible for gas shut off: \_\_\_\_\_

## ***Appendix F: Effective Severe Weather Plan Worksheet***

### **Threats:**

Tornado

Extreme Wind greater than \_\_\_\_\_ mph

**Time needed to get everyone to shelter:** \_\_\_\_\_

### **Who will monitor the weather?**

Designated Weather Watcher: \_\_\_\_\_

### **Criteria for initiating the plan:**

**Consider time needed, neighboring counties, warnings, severe weather sightings**

Warnings: \_\_\_\_\_

Reports: \_\_\_\_\_

Other: \_\_\_\_\_

### **Logistics of initiating the plan:**

Who will initiate action: \_\_\_\_\_

How will action be initiated: \_\_\_\_\_

### **Shelter Areas:**

**Safe-rooms are best; Otherwise small-span, interior rooms, minimize windows, maximize walls, protect from debris**

Designated shelter areas: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

### **Giving the “all-clear”:**

When: \_\_\_\_\_

How: \_\_\_\_\_

### **Practicing the plan:**

***Evaluate time needed, suitability of shelters; Consider activities, outbuildings, etc.***

When: \_\_\_\_\_